

## 2019-2021 Spill Operation Agreement

December 2018

### **I. PARTIES**

For purposes of this 2019-2021 Spill Operation Agreement (Agreement), the “Parties” means the State of Oregon, the State of Washington, the Nez Perce Tribe, the U.S. Army Corps of Engineers (Corps), the U.S. Bureau of Reclamation (Reclamation), and the Bonneville Power Administration (Bonneville).

### **II. PURPOSE**

This Agreement describes planned 2019-2021 spring fish passage spill operations, using the flexible spill and power principle and objectives described below, and is intended to avoid litigation until the National Environmental Policy Act remand process (commonly referred to as the Columbia River System Operations Environmental Impact Statement and associated Records of Decision) ordered by the United States District Court for the District of Oregon in *National Wildlife Federation v. National Marine Fisheries Service*, Case No. 3:01-cv-00640, (*NWF et al v. NMFS*) is completed.

The Parties have entered into this Agreement in the spirit of regional collaboration with the shared goal of meeting the principles and objectives described below. In order for this collaboration to be possible, the Parties emphasize that, when this Agreement is not in effect, this Agreement is not intended to be used in any litigation or other forum as precedent for, or an endorsement of, any operation, and this Agreement does not represent an endorsement of any biological opinion NOAA Fisheries issues regarding the Columbia River System.

### **III. FLEXIBLE SPILL AND POWER PRINCIPLE AND OBJECTIVES**

- A. The principle central to this Agreement is implementing a flexible approach to providing spill to benefit juvenile spring fish passage in concert with managing the Columbia River System for multiple congressionally-authorized purposes, including power generation to assure the Pacific Northwest of an adequate, efficient, economical, and reliable power supply.
- B. To fulfill this principle, and solely for purposes of this Agreement, the Parties have adhered, and will continue to adhere, to the following objectives in establishing the planned fish passage spill operations described in this Agreement:
  1. Provide fish benefits, with the understanding that (i) in 2019, overall juvenile fish benefits associated with dam and reservoir passage through the lower Snake and Columbia rivers during the spring fish passage season must be at least equal to 2018 spring fish passage spill operations ordered by the Court, and (ii) in 2020 and 2021, these fish benefits are improved further (as estimated through indices of

improved smolt-to-adult returns, e.g., PITPH, reservoir reach survival, fish travel time); and

2. Provide federal power system benefits as determined by Bonneville, with the understanding that Bonneville must, at a minimum, be no worse financially compared to the 2018 spring fish passage spill operations ordered by the Court;<sup>1</sup> and
3. Provide operational feasibility for the Corps implementation that will allow the Corps to make appropriate modifications to planned spring fish passage spill operations.<sup>2</sup>

#### **IV. DEFINITIONS**

- A. “Action Agencies” means the Corps, Reclamation, and Bonneville. These agencies jointly manage Columbia River System operations.
- B. “Columbia River System” refers to the fourteen federal dam and reservoir projects within the Federal Columbia River Power System that are operated as a coordinated water management system for multiple congressionally-authorized project purposes.
- C. “Fish” means salmon and steelhead species listed under the Endangered Species Act.
- D. “Gas cap” refers to the applicable state Total Dissolved Gas (TDG) water quality standards (in percent TDG).
- E. “Gas cap spill” means spill to the maximum spill level that meets, but does not exceed, the TDG criteria allowed under the applicable state water quality standard at the four Lower Snake River and four Lower Columbia River projects.
- F. “Lower Columbia River projects” refers to McNary, John Day, The Dalles, and Bonneville dams.
- G. “Lower Snake River projects” refers to Lower Granite, Little Goose, Lower Monumental and Ice Harbor dams.
- H. “NEPA Remand Process” refers to development of the Columbia River System Operations Environmental Impact Statement. This Process will conclude upon the signature of Records of Decision by the Action Agencies.

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<sup>1</sup> Bonneville shall have sole discretion over how it conducts its financial analysis. Bonneville measured the financial cost of the 2018 Court-ordered operations using the methodology in Bonneville’s rate proceedings for calculating the estimated average annual cost of additional planned spring fish passage spill in excess of planned spill levels in the Corps’ 2017 Fish Operations Plan.

<sup>2</sup> As described in Section VI.A.

- I. “PITPH” is the calculated probability, based on Passive Integrated Transponder (PIT) tag detections, that a juvenile fish will pass through one or more powerhouse routes on its outmigration. A PITPH of 0 signifies the fish is projected to pass through 0 of 8 turbines/bypasses and a PITPH of 8 signifies the fish passed through 8 of 8 turbines/bypasses.
- J. “Spill cap” means the spill level (flow through the spillway measured in kcfs) at each project that the Corps estimates will maximize spill to a level that meets, but does not exceed, the Gas cap.
- K. “120% TDG spill” means planned juvenile fish passage spill targeting the maximum level that meets, but does not exceed, the Gas cap for 120% TDG in the tailrace, with Spill caps derived by the Corps using the procedures referenced in Section VI.A, below.
- L. “125% TDG spill” means planned juvenile fish passage spill targeting the maximum level that meets, but does not exceed, the Gas cap for 125% TDG in the tailrace, with Spill caps derived by the Corps using the procedures referenced in Section VI.A, below.

## **V. STATE WATER QUALITY STANDARDS**

- A. The TDG standard for the states of Washington and Oregon is 110%. Both states have provided exceptions to the TDG standard for juvenile fish passage spill operations on the lower Snake River and lower Columbia River. Oregon and Washington intend to work to harmonize their respective methodologies for measuring TDG for the duration of this Agreement. To the extent standards and/or methodologies differ between the two states, the Corps will apply the more stringent standard and/or methodology when operating under all applicable state TDG water quality standards. Oregon and Washington are responsible for any modifications to water quality standards that result from the processes contemplated below.

- B. Washington:**

- 1. Washington’s current criteria adjustment standard provides that TDG must not exceed an average of 115% as measured in the forebays of the next downstream dams and must not exceed an average of 120% as measured in the tailraces of each dam (these averages are measured as an average of the 12 highest consecutive hourly readings in any one day, relative to atmospheric pressure); and a maximum TDG one hour average of 125% must not be exceeded during spillage for fish passage. WAC § 173-201A-200(l)(f)(ii).
  - 2. Washington Department of Ecology (Ecology) is in the process of considering a short-term modification that eliminates Washington’s current forebay TDG standard at the Lower Snake River projects and Lower Columbia River projects

and aligns Washington's calculation methodology with Oregon's current methodology. Ecology acknowledges that there is a desire for this short-term modification to be in effect on or before April 3, 2019, and will work to render a timely decision.

3. Ecology also intends to consider whether to allow spring juvenile fish passage spill up to 125% TDG (as read in the tailrace) under certain conditions. Ecology expects to make a decision on the modification up to 125% TDG prior to the beginning of the 2020 spring juvenile fish passage spill season.

C. Oregon:

1. Oregon's current standard modification provides that spill must be reduced when the average TDG concentration of the 12 highest hourly measurements per calendar day exceeds 120% of saturation at monitoring stations in the tailraces of McNary, John Day, The Dalles, and Bonneville dams, and spill must be reduced when instantaneous TDG levels exceed 125% of saturation for any 2 hours during the 12 highest hourly measurements per calendar day at monitoring stations in the tailraces of McNary, John Day, The Dalles, and Bonneville dams. OR. ADMIN. R. 340-041-0031 and 340-041-104(3).
2. The Oregon Department of Environmental Quality (ODEQ) will ask the Oregon Environmental Quality Commission (EQC) to consider changing the current standard modification to allow spring juvenile fish passage spill up to 125% TDG (as read in the tailrace) at the four Lower Columbia River dams. This issue will be presented to the EQC in time for any potential modification to be in effect for the 2020 spring juvenile fish passage spill season.

## VI. SPILL OPERATION

A. General Provisions for Implementing Planned Fish Passage Spill Operations

1. In implementing the planned fish passage spill operations, the Corps will use the process and procedures set forth in the annual Fish Operations Plan and Current Procedures for Setting Spill Caps to establish Spill caps and target spill levels.
2. In-Season Adjustments: In managing the Columbia River System for multiple congressionally-authorized project purposes, the Corps may adjust the planned fish passage spill operations to address conditions set forth in the section of the annual Fish Operations Plan entitled "Modifications to Planned Operations and In-Season Management."

B. 2019 Fish Passage Spill Operations

1. Spring Operations

- a. To meet the flexible spill and power principle and objectives in Section III above, and if the conditions in Section IX.A and Section X are met, the Action Agencies will implement planned juvenile fish passage spring spill operations targeting the spill levels and times provided in **Attachment Table 1.1** in a manner consistent with the general spill implementation provisions in Section VI.A, above.
- b. The Parties acknowledge that the 2019 spring spill operations set forth in this Agreement are contingent upon securing a modification to Washington's water quality standard as described in Section V.B, above.

2. Summer Operations

- a. After implementing the juvenile fish passage spring spill operations in **Attachment Table 1.1**, the Action Agencies will then implement the 2019 planned juvenile fish passage summer operation shown in **Attachment Table 1.2**.

C. 2020 and 2021 Fish Passage Spill Operations

1. If the conditions in Sections V.B.3, V.C.2, IX.A, and X are met, and consistent with Section III, the Parties agree that 2020 and 2021 operations will incorporate spill up to and including 125% TDG as a tool for spring fish passage spill season. Collaborative technical work performed to date has identified representative spring spill operation scenarios. Preliminary analyses indicate these scenarios, which incorporate 125% TDG spill as a tool, meet the Section III principle and objectives (see **Attachment Tables 1.3a-b**).<sup>3</sup>

Building on further analysis of these representative scenarios and in consideration of 2019 results, the Parties will continue in good faith to evaluate the effect of different variables, such as project-specific spill levels and duration (both daily and seasonal), to refine 2020-2021 spring operations, and complete a final specific operations plan by September 1, 2019. If the Parties cannot agree on a refined operation, one of the two representative spring spill operations shown in **Attachment Tables 1.3a-b** will be implemented in the 2020-2021 spill seasons

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<sup>3</sup> Bonneville's analysis, in particular, is especially preliminary and has a high level of uncertainty. Bonneville's financial models were not designed to handle the data associated with daily changes in spill at 125% TDG spill. As a result, Bonneville does not yet have full confidence in the results of the models. Accordingly, the Parties recognize Bonneville will continue to revise its evaluation of the financial implications of any 125% TDG scenarios.

for such time as this Agreement remains in effect, or until the Parties can agree on refinements.

The representative operations shown in Attachment Tables 1.3.a-b do not incorporate 125% TDG spill on a 24-hour, 7-day basis simultaneously at all Lower Columbia River projects and Lower Snake River projects. Such an operation would be inconsistent with the flexible spill and power objectives that are central to this Agreement.

2. The Parties presume that adjustments to summer spill operations in 2020-2021 will likely be necessary to meet the power-cost objective in Section III.B.2. To that end, the Parties have developed the operation reflected in **Attachment Table 1.4**. This operation is designed to meet the power-cost objective, while limiting potential reductions in spill to the last two weeks of August. The Parties agree that, subject to the iterative process specified in Section VI.C.1 above, this operation represents the maximum reduction in summer spill that is compatible with the Section III principle and objectives.
3. The Parties commit to ensuring their analyses are transparent and collaborative. For example, the Parties will continue to share and explain the assumptions and outputs of the biological and financial models, as well as information on any structural or operational constraints that may affect implementation of this Agreement.
4. The Parties acknowledge that implementation of 2020-2021 spring spill operations is contingent upon securing a modification to Washington and Oregon's water quality standards to allow for spill up to 125% TDG as described in Section V above.

## VII. MONITORING

With regard to monitoring associated with this Agreement, the Parties agree that:

- A. Monitoring activities for juvenile and adult salmon and steelhead relative to mainstem hydrosystem operations and conditions are generally in place. In addition, the Parties support the installation of a PIT tag detection array on the Lower Granite Removable Spillway Weir as soon as feasible, currently anticipated for use in 2020.
- B. No additional PIT tagging is needed for analyses for spring/summer Chinook and steelhead. Additional PIT tagging, above current levels, may be desired for summer migrating fall Chinook and sockeye.
- C. Enhanced sampling of resident fish, invertebrates, and amphibians may be desirable in 2019. Enhanced sampling activities that meet monitoring needs may be required in 2020-

2021. Existing monitoring of TDG and Gas Bubble Trauma in salmonids will continue. TDG and Gas Bubble Trauma monitoring may be enhanced if deemed necessary and funded.

- D. Validation of fish behavior assumptions inherent in the modeled fish benefits relative to Spill Passage Efficiency are important and may require additional evaluation.
- E. Possible approaches, study designs and funding sources of any new monitoring activities discussed in this Section VII are being explored and discussed, but any additional monitoring Bonneville agrees to fund for the purposes of this Agreement must be within Bonneville's existing overall Fish and Wildlife Program budget. The Corps will continue current monitoring commitments in furtherance of this Agreement.

## **VIII. REPORTING**

- A. The Fish Operations Plans for 2019, 2020 and 2021 will include the same reporting provisions as those set forth in the 2018 Fish Operations Plans. The Corps will provide status updates at the regularly scheduled Technical Management Team (TMT) meetings about the spring fish passage spill operations including review of the project Spill caps and resultant TDG level during the relevant time period. The Corps will address clarifying questions of the status update at the TMT meeting. In the event that a dispute results from the Corps' status update of the project Spill caps and resultant TDG level, that dispute should be expeditiously elevated by the Party seeking resolution of the dispute to the Regional Implementation Oversight Group (RIOG) in accordance with the established Regional Forum process.
- B. Parties to this Agreement agree to participate in the Regional Forum process in a manner that is consistent with the established processes of those groups and is respectful to all participants.

## **IX. EFFECTIVE DATE, WITHDRAWAL AND TERMINATION**

- A. Effective Date.

This Agreement shall become effective where the following two conditions are met:

1. Signatures by the Parties to this Agreement, and
2. The filing of a notice with the U.S. District Court for the District of Oregon in *NWF et al v. NMFS*, that contains representations by the Parties to this Agreement and the National Wildlife Federation, et al., plaintiffs that they do not intend to file or engage in any litigation in *NWF et al v. NMFS* while this Agreement is in effect.

B. Withdrawal.

Any Party may withdraw following conferral and notice pursuant to Section XI below, upon the occurrence of any of the following:

1. The Action Agencies do not continue to implement habitat, hatchery, and monitoring and evaluation actions that provide an equivalent level of protection to fish and wildlife as they are currently implementing under the Action Agencies' 2008 Records of Decision or Record of Consultation and Statement of Decision for the Columbia River System, as supplemented in 2010 and 2014, to the satisfaction of Oregon, Washington or the Nez Perce Tribe.
2. Failure to satisfy any of the conditions or commitments set forth in this Agreement.
3. A Reasonable and Prudent Alternative action providing a fish passage spill operation inconsistent with the provisions of this Agreement, which either U.S. Fish and Wildlife Service or NOAA Fisheries issues following an ESA consultation.
4. While this Agreement is in effect, the filing of any complaint or motion for declaratory, injunctive, or other relief in *NWF et al v. NMFS*, or the initiation of any new action in any court that relates to actions or operations addressed in NOAA Fisheries' 2008 Columbia River System biological opinion and the Action Agencies' 2008 Records of Decision or Record of Consultation and Statement of Decision, as supplemented in 2010 and 2014.

C. Termination.

1. The Agreement terminates automatically upon the completion of the NEPA Remand Process.
2. The Agreement terminates automatically should the Court in *NWF et al v. NMFS* modify the terms of this Agreement in any manner, including adopting some or all of the terms of the Agreement as a court order.
3. If modification of Washington or Oregon's water quality standards does not occur, any Party may terminate this Agreement.
4. If any Party withdraws from this Agreement pursuant to Section IX.B., above, the Agreement may be terminated by any Party following conferral and notice of termination pursuant to Section XI below.

## **X. FORBEARANCE, RESERVATION OF RIGHTS, NO PRECEDENTIAL EFFECT**

- A. While this Agreement is in effect, the State of Oregon and Nez Perce Tribe agree to forbear from filing motions or seeking relief (including declaratory or injunctive relief) in *NWF et al v. NMFS*, and from filing any new action in any court that relates to actions or operations addressed in NOAA Fisheries' 2008 Columbia River System biological opinion and the Action Agencies' 2008 Records of Decision or Record of Consultation and Statement of Decision, as supplemented in 2010 and 2014.
- B. Nothing in this Agreement alters or modifies the Parties' rights (including any claims or defenses) in *NWF et al v. NMFS* or any other forum, and no Party makes any concessions regarding the legal validity, scientific validity, or economic cost/benefit of the spill operations contemplated in this Agreement, the Columbia River System Operations Environmental Impact Statement, or any biological opinion NOAA Fisheries issues on the Columbia River System.
- C. The Parties agree that this Agreement is not intended to be construed as a consent decree enforceable as a court order in *NWF et al v. NMFS*, or otherwise cited or used as precedential on any legal or factual matter in *NWF et al v. NMFS*. The sole and exclusive remedy for any alleged breach or unresolved dispute under this Agreement (following good faith efforts by the Parties to resolve the dispute pursuant to Section XI below) is to withdraw from the Agreement.
- D. Nothing in this Agreement shall be interpreted as or constitutes a commitment or requirement that Reclamation, the Corps, or Bonneville pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. § 1341.
- E. Nothing in this Agreement shall be interpreted as limiting the authority granted to, or retained by, the State of Oregon or the State of Washington under the Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. §§ 1251-1387).
- F. Nothing in this Agreement shall be construed as a waiver of any Party's sovereign immunity.

## **XI. MEET AND CONFER**

- A. The Parties agree to communicate the provisions of the Agreement to appropriate staff and work in good faith through existing RIOG coordination and adaptive management processes to implement the terms of this Agreement.
- B. The Parties agree that a Party may exercise its withdrawal or termination options only after: (1) informing the Parties in writing of the issue to be addressed; (2) working in good faith with the Parties to resolve the issue; and (3), where the issue cannot be

resolved, provide written notice to the Parties that the Party is withdrawing from or terminating the Agreement.

- C. As detailed in Section VIII, any disputes arising out of the Corps' status updates on project spill caps and resultant TDG level from spring fish passage spill operations at the regularly scheduled TMT meetings should be immediately elevated to the RIOG in accordance with the established Regional Forum process by the Party seeking resolution of a dispute. RIOG meetings to resolve any disputes will be conducted as appropriate under that established process.

## **XII. SIGNATURES**

By signing below, the Parties represent they affirmatively support this Agreement and its implementation.

The signatures of the State of Oregon, the State of Washington, the Nez Perce Tribe, Reclamation, the Corps, and Bonneville appear on the following pages 11-16.



OREGON

December 13, 2018

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Kate Brown  
Governor  
State of Oregon

Date

NEZ PERCE TRIBE



Shannon F. Wheeler  
Chairman  
Nez Perce Tribe

12-14-18

Date

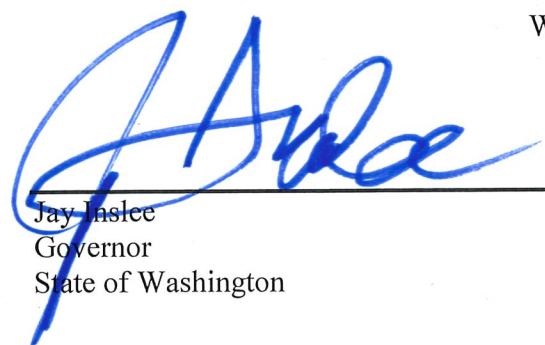


Casey L. Mitchell  
Secretary  
Nez Perce Tribe

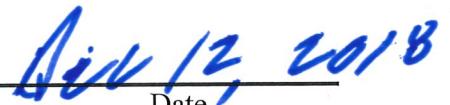
12-14-18

Date

WASHINGTON



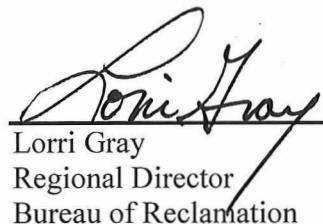
Jay Inslee  
Governor  
State of Washington



July 12, 2018

Date

BUREAU OF RECLAMATION



*Lorri Gray*  
Lorri Gray  
Regional Director  
Bureau of Reclamation

*12/4/18*  
Date

U.S. ARMY CORPS OF ENGINEERS



12 DEC 2018

Brigadier General D. Peter Helmlinger  
Commander, Northwestern Division  
U.S. Army Corps of Engineers

Date

BONNEVILLE POWER ADMINISTRATION

Elliot Mainzer

12/14/18

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Elliot Mainzer  
Administrator  
Bonneville Power Administration

Date

## Attachment

**Table 1.1.**

Planned 2019 spring spill operation, applying estimated 120% mean total dissolved gas spill caps and performance standard spill<sup>4</sup> flex operations.

Location	COE Estimated Mean 120% Total Dissolved Gas Spill Cap (16 hours)	Performance Standard Spill (8 hours)
Lower Granite	45 kcfs	20 kcfs
Little Goose	52 kcfs	30%
Lower Monumental	44 kcfs	30 kcfs (bulk spill pattern)
Ice Harbor	87 kcfs	30%
McNary	180 kcfs	48%
John Day	146 kcfs	32%
The Dalles	135 kcfs	40%
Bonneville	122 kcfs	100 kcfs

Key points:

- Spring spill operations would be initiated April 3 and April 10<sup>th</sup> and transition to summer spill operations on June 21 and June 16 at Lower Snake River projects and at Lower Columbia River projects, respectively.
- The 8 hours of performance standard spill would occur with some flexibility. Only Little Goose would be set to at least 4 hours in the a.m. (beginning near dawn and not to exceed 5 hours in the a.m.) and no more than 4 hours in the p.m. (generally near dusk) to help with adult passage issues. All other projects could spill either 3 or 4 hours for the performance standard spill a.m. time period and then up to a max of 5 hours in the performance standard spill p.m. period (not to exceed 8 hours in the day).
- No ponding above current MOP assumptions: Snake River - MOP+1.5 ft (to provide 1 ft. of useable space); John Day - MIP+2 ft (to provide 1.5 ft. of useable space).
- Controlled spill at Bonneville Dam capped at 150 kcfs due to erosion concerns.
- Controlled spill at The Dalles contained between the walls (Bays 1-8) unless river flows were over 350 kcfs then spill outside the walls would be permitted.
- Existing adaptive management processes will be employed to help address any unintended consequences that may arise in-season as a result of implementing these proposed spill operations.
- Spill may be temporarily reduced at any project if necessary to ensure navigation safety or transmission reliability.

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<sup>4</sup> “Performance standard” spill is a NOAA Fisheries term and refers to spill levels intended to meet NOAA’s performance standard testing, as described in the 2008 Biological Opinion and accompanying administrative record.

**Table 1.2.**

Planned summer spill operations, starting June 21 at Lower Snake River projects and June 16 at the Lower Columbia River projects through August 31, 2019; no spill curtailment criteria. Table 1.1 key points apply.

Location	Summer Spill Operation: Volume/Percent of Total Flow Routed to Spillway (June 21/16 – Aug 31)
Lower Granite	18 kcfs
Little Goose	30%
Lower Monumental	17 kcfs
Ice Harbor	30%
McNary	57%
John Day	35%
The Dalles	40%
Bonneville	95 kcfs

**Table 1.3.a.**

Representative spring spill alternative one, for implementation in 2020 and 2021. Six projects using 125% TDG flexible spill, John Day (JDD) using 120% TDG flexible spill and The Dalles (TDA) using 24 hour performance standard spill. Table 1.1 key points apply.

Location	COE Estimated mean 125% Total Dissolved Gas Spill Cap (16 hours), with alternative operation at JDD and TDA.	Performance Standard Spill (8 hours).
Lower Granite (125 flex)	72 kcfs	20 kcfs
Little Goose (125 flex)	79 kcfs	30%
Lower Monumental (125 flex)	98 kcfs	30 kcfs (bulk spill pattern)
Ice Harbor (125 flex)	119 kcfs	30%
McNary (125 flex)	265 kcfs	48%
John Day (120 flex)	146 kcfs	32%
The Dalles (Performance Standard)	40%	40%
Bonneville (125 flex)	150 kcfs	100 kcfs

**Table 1.3.b.**

Representative spring spill alternative two, for implementation in 2020 and 2021. Six projects using 125% TDG flexible spill with JDD and TDA using 24-hour performance standard spill. Table 1.1 key points apply.

Location	COE Estimated mean 125% Total Dissolved Gas Spill Cap (16 hours), with alternative operation at JDD and TDA.	Performance Standard Spill (8 hours)
Lower Granite (125 flex)	72 kcfs	20 kcfs
Little Goose (125 flex)	79 kcfs	30%
Lower Monumental (125 flex)	98 kcfs	30 kcfs (bulk spill pattern)
Ice Harbor (125 flex)	119 kcfs	30%
McNary (125 flex)	265 kcfs	48%
John Day (Performance Standard)	32%	32%
The Dalles (Performance Standard)	40%	40%
Bonneville (125 flex)	150 kcfs	100 kcfs

**Table 1.4.**

Planned summer spill operations for 2020 and 2021. Cessation of juvenile transportation June 21 through August 14 with allowance for Technical Management Team adaptive management adjustments.

Location	Initial Summer Spill Operation: Volume/Percent of Total Flow Routed to Spillway (June 21/16 – August 14)	Late Summer Transitional Spill Operation: Volume/Percent of Total Flow Routed to Spillway (August 15 – August 31)
Lower Granite	18 kcfs	RSW or 7 kcfs
Little Goose	30%	ASW or 7 kcfs
Lower Monumental	17 kcfs	RSW or 7 kcfs
Ice Harbor	30%	RSW or 8.5 kcfs
McNary	57%	20 kcfs
John Day	35%	20 kcfs
The Dalles	40%	30%
Bonneville	95 kcfs	55 kcfs - includes 5k corner collector